INSURVLANT 4730/5
(09/02)

GUIDE FOR THE NAVIGATOR

REF: **(a) INSURVINST 4730.1 series**

ENCL: **(1) NV EOC**
(2) Steering System Test
(3) Navigation Light Report
(4) In Port Fix Comparison

1. **Introduction: This guide supplements the navigation section of reference (a), which should be reviewed carefully. A systematic, well-planned inspection requires substantial effort in two major areas, preparation and execution. INSURV is a completely open inspection. The Inspector's aim is to make a complete factual report of the material condition of the equipment or system inspected. This report is invaluable in preparing work requests for availability's and overhaul.**

2. **Preparation: Because inspection time is limited, an effective inspection requires advance preparation and readiness to demonstrate the ship in accordance with reference (a). The following should be completed prior to commencement of the inspection:**

   a. 48 hours prior to the inspection.

      (1) Ensure that gyrocompasses or inertial navigation systems (INS) are energized and allowed to settle out.

Once gyrocompasses or INS are settled, take four series of three quick azimuths with twenty minutes between each series on each gyrocompass. If weather prevents this procedure, be alert for opportunities to obtain azimuths throughout the inspection. Record test results:

48-HOUR AZIMUTH

COMPASS/INS		FIRST	SECOND	THIRD	FOURTH
MAIN	(1)	_____	_____	_____	_____
	(2)	_____	_____	_____	_____
	(3)	_____	_____	_____	_____
Auxiliary	(1)	_____	_____	_____	_____
	(2)	_____	_____	_____	_____
	(3)	_____	_____	_____	_____

b. Prior to 0800 the first day:

(1) Energize ALL bridge and signal bridge IC circuits.

(2) Inform ships alongside and others as required (SOPA, etc.) that the rudder and Fathometer will be exercised/tested that morning and that navigational radars will be energized.

(3) Obtain blanket permission from CO/CDO to test the whistle and all alarms from all stations the morning of the first day of inspection.

(4) Have all portable equipment (telescopic alidades, portable whistle, binoculars, sextants, bearing circles, etc.) broken out on the bridge with appropriate annotation in enclosure (4).

c. Have the following records available in the pilothouse or chart house for review at the start of the inspection.

(1) Navigation Light Certificate/Report.

(2) Profile Light Plan. (Check ship's Plan Index in Log Room. If no separate plan exists, it may be incorporated in the outboard Profile Plate of the Ship's Booklet of General Plans.)

(3) Suez Canal Certificate and Tonnage Certificate.

(4) Panama Canal Certificate (Auxiliary ship's).

(5) Navigation Certification.

(6) Magnetic Compass Record Book and data cards.

(7) Navigation Timepiece record Book.

(8) Azimuth section of Navigation Work Book.

(9) CSMP for navigation and signal bridge work centers.

(10) Annotated copy of previous INSURV Navigation section, line out corrected deficiencies.

(11) Completed enclosures of this document with the requested information and self-assessment results.

d. Know the location of the applicable pages of COSAL covering navigation and signal equipment.

3. Execution: The inspection will proceed in accordance with the ship's agenda. Flexibility is essential to keep the inspection progressing, as unforeseen delays will occur. Navigation inspections normally are executed as follows:

a. The following will be observed or demonstrated on day one:

(1) Steering system accuracy checks: have rudder and rudder indicators energized and phone circuits ready to be manned. Checks will be conducted per enclosure (2).

(2) Engine Order Telegraph; have energized and engine room ready to answer.

(3) Electronic NAVAIDS.

(4) Fathometer.

(5) Bell and gong.

(6) Whistle: manually, electric push button, and timer.

(7) Gyro repeaters; have all repeaters energized, repeater alignment data posted, and benchmarks uncovered.

(8) Alarms; including gyro failure, steering, and various call buzzers.

(9) Secondary conning stations.

(10) Window heaters, washers and wipers.

(11) All meteorological equipment: installed and hand held anemometer, psychrometer and barometers as annotated in enclosure.

(12) All navigation lights and beacons will be conducted Monday morning. Have a night vision device available to observe mast mounted infrared signal lights for nighttime underway.

(13) Plotting and NAVAID accuracy. Plot a pier side visual, radar, and all electronic NAVAID fix to determine position error. Record plot in enclosure (4).

(14) Ship compass as annotated in enclosure (1).

(15) Operation of white and/or red lighting on consoles, indicators, repeaters, and compass.

(16) Autopilot: If inport static checks are successful.

b. The following will be observed or demonstrated underway:

(1) Conduct a range check to determine heading error while leaving or entering port.

(2) Full power steering checks in the ahead and astern direction per enclosure (2).

(3) Operation of all indicators and repeaters.

(4) Autopilot.

c. The following will be observed or demonstrated on day two.

(1) Any remaining inport items not completed.

4. <u>Conclusion</u>. The inspection is complete when the Inspector has finalized the report and presented findings to the Senior Inspector. After briefing the Senior Inspector, the inspector will review every deficiency with the Navigator and provide a printed report and/or computer disk with the report file. Any differences of reference interpretation should be discussed frankly. The accuracy of the inspection is critical for future improvement of the ship inspected as well as all ships of the class and future construction.

SIGNAL EQUIPMENT AND DATA

1. **Flag and shape hoists.**

   a. **Halyards: Plaited polyester rope: _____**

   b. **Number of hoists:**

SHIP'S FLAG SIZE	# REQ'D	# INST'D
3 ½	3	_____
4	3	_____
6	2	_____
8	1	_____

   c. **Flag ships, one additional hoist on yardarms? _____(Y/N)**

   d. **2 or more hoists on battle gaff? _____(Y/N)**

   e. **3 hoists on trident truck at each masthead? _____(Y/N)**

   f. **Hoist for anchor or not-under-command balls? _____(Y/N)**

2. **Signal searchlights 360-degree coverage: _____(Y/N)**

3. Night vision and infrared equipment:

NOMENCLATURE	# ONBOARD	# ALLOWED
AN/KAS - 1	_____	_____
AN/PVS - 5	_____	_____
AN/PVS - 8	_____	_____
AN/SAR - 7	_____	_____
AN/SAT - 2	_____	_____
Hand keys	_____	_____

NV EOC rev 2002

**** TO THE NAVIGATOR: FOLLOW THE EOC SCORES SHOWN ON THE RIGHT. COMPLETE THIS SELF-ASSESSMENT PRIOR TO THE INSPECTION AND PRESENT TO THE NV INSPECTOR.*******

SHIP: USS

EOC SCORES:
"0.0 - 0.2: Inoperative/Item Missing"
"0.3 - 0.4: Major problems"
"0.5 - 0.6: Limited capability"
"0.7 - 0.8: Minor problems"
"0.9: Operable (Minor problems)"
"1.0: SAT (No problems of any kind)"

NAVIGATION

DOCUMENTS:

NAV LIGHT CERTIFICATE/REPORT	
PROFILE LIGHT PLAN	
SUEZ CANAL CERT	
PANAMA CANAL CERT	
MAGNETIC COMPASS	
NAV TIMEPIECE RECORD BOOK	
AZIMUTH WORK BOOK	
NAVIGATION CERTIFICATION (NAVSEA INST 9420.4)	

TOTAL DOCUMENTS EOC: #DIV/0!

NAVIGATION EQUIPMENT:	**#1**	**#2**	**#3**	**#4**	**#5**	**#6**	**TOTAL**
BEARING CIRCLES							#DIV/0!
AZIMUTH CIRCLES							#DIV/0!
ALIDADES							#DIV/0!

SEXTANTS							#DIV/0!
STADIMETER							#DIV/0!
PORTABLE WHISTLE							#DIV/0!
PORTABLE ANENOMETER							#DIV/0!
PSYCHROMETER							#DIV/0!
BAROMETER							#DIV/0!
LOOKOUT BINOCULARS							#DIV/0!
WEATHER FAX							#DIV/0!

TOTAL NAV EQUIPMENT: #DIV/0!

STEERING CHECK

HELM ORDER INDICATOR	
RAI - PORT BW	
RAI - SCC	
RAI - STBD BW	
RAI - SECONDARY CON	

TOTAL STEERING CHECK: #DIV/0!

SHIP CONTROL CONSOLE:

LIGHTING	
ALARMS	
INDICATORS	
SWITCHES	
STEERING CASUALTY CONTROL ALM	
AUTOPILOT	

TOTAL SHIP CONTROL CONSOLE: #DIV/0!

GYRO COMPASS:	**#1**	**#2**	**#3**
OPERATIONAL EOC			

TOTAL GYRO COMPASS: #DIV/0!

GYRO REPEATERS:	**PORT**	**QM TABLE**	**C-LINE**	**SCC**	**STBD**
OPERATIONAL EOC					
BENCHMARK EOC		NA		NA	

TOTAL GYRO REPEATERS: #DIV/0!

PITCH AND EOT INDICATORS:	**PORT**	**QM TABLE**	**C-LINE**	**SCC**	**STBD**
OPERATIONAL EOC					

TOTAL PITCH AND EOT REPEATERS: #DIV/0!

WHISTLE TEST:	
MANUAL EOC	
ELECTRICAL SWITCH EOC	
TIMER EOC	

TOTAL WHISTLE TEST: #DIV/0!

TIME PIECES:	**#1**	**#2**	**#3**

TOTAL TIME PIECES: #DIV/0!

FATHOMETER:	
SYSTEM OPERATIONAL EOC	
SONAR READ OUT EOC	
BRIDGE READ OUT EOC	

CHART ROOM	
TOTAL FATHOMETER:	#DIV/0!

MAGNETIC/DIGITAL FLUX GATE COMPASS:	
TOTAL MAGNETIC COMPASS:	0

WINDOW HEATERS:	**TOTAL**	**INOP**
TOTAL WINDOW HEATERS:	#DIV/0!	

WINDOW WIPERS:	**TOTAL**	**INOP**	**EOC OF OTHER DEFICIENCIES**
TOTAL WINDOW WIPERS:	#DIV/0!		

WINDOW WASHERS:	**TOTAL**	**INOP**	**EOC OF OTHER DEFICIENCIES**
TOTAL WINDOW WASHERS:	#DIV/0!		

SHIPS BELL:	
TOTAL SHIPS BELL:	0
SHIPS GONG:	

TOTAL SHIPS GONG:	0

AN/WRN-6/NAVSSI (AN/SSN-6):

OPERATIONAL EOC	
CIC READOUT	
BRIDGE READOUT	
TOTAL AN/WRN-6:	#DIV/0!

NAVIGATION LIGHTS:

PORT RUNNING LIGHT	
STBD RUNNING LIGHT	
STERN LIGHT	
BLUE STERN LIGHT	
WAKE LIGHT	
FWD MASTHEAD LIGHT	
AFT MASTHEAD LIGHT	
TASK LIGHTS	
A/C WARNING LIGHTS	
NOT UNDER COMMAND LIGHTS	
HELO HOMING LIGHT	
TOTAL NAVIGATION LIGHTS:	#DIV/0!

BRIDGE TO BRIDGE VHF RADIO:

OPERATIONAL EOC	
TOTAL BRIDGE TO BRIDGE:	0
DRT	
DRAI	

PITLOG/DSVL	

TOTAL NAVIGATION: #DIV/0!

SIGNAL BRIDGE

HALYARDS:	**TOTAL**	**MISSING**	**EOC OF OTHER DEFICIENCIES**

TOTAL HALYARDS: #DIV/0!

FLAGBAGS:	**% DRY ROT**	**% MISSING**

TOTAL FLAGBAGS: 1

SIGNAL SEARCH LIGHTS:	**TOTAL**	**INOP**	**EOC OF OTHER DEFICIENCIES**

TOTAL SIGNAL SEARCH LIGHTS: #DIV/0!

MULTIPURPOSE LIGHTS:	**TOTAL**	**INOP**	**EOC OF OTHER DEFICIENCIES**

TOTAL MULTIPURPOSE LIGHTS: #DIV/0!

NIGHT VISION:	**TOTAL**	**INOP**	**EOC OF OTHER DEFICIENCIES**	
PVS-8				#DIV/0!
PVS-5				#DIV/0!

TOTAL NIGHT VISION: #DIV/0!

SHIP'S BINOCULARS	**TOTAL**	**INOP**	**EOC OF OTHER DEFICIENCIES**

TOTAL SHIP'S BINOCULARS: #DIV/0!

AN/KAS-1:	**TOTAL**	**INOP**	**EOC OF OTHER DEFICIENCIES**

TOTAL AN/KAS-1: #DIV/0!

AN/SAT-2:	**TOTAL**	**INOP**	**EOC OF OTHER DEFICIENCIES**

TOTAL AN/SAT-2: #DIV/0!

YARD ARM BLINKERS

OPERATIONAL EOC	

TOTAL YARD ARM BLINKERS: #DIV/0!

TOTAL SIGNAL BRIDGE: #DIV/0!

TOTAL NV EOC ROLLUP

		WEIGHT	TOTAL
BRIDGE/NAVIGATION SCORE	#DIV/0!	0.7	#DIV/0!
SIGNAL BRIDGE SCORE	#DIV/0!	0.3	#DIV/0!

TOTAL NAV SCORE #DIV/0!

(encl 1)

STEERING SYSTEM INDICATOR ALIGNMENT TEST

This steering system test is to be conducted on day one. Coordinate with the auxiliary and electrical officer to provide power and personnel test. The test will be coordinated from the bridge. The purpose of the test is to verify the accuracy of the rudder response to a given order a the accuracy of the rudder angle indicators.

2. Test will be conducted as follows and results recorded on ENCL 2.

a. Rudder Order indicator is positioned at 30 degrees left rudder. The actual rudder position from the rudderpost is relayed to the b along with the rudder angle indicator positions from all stations.

b. Rudder Order is then positioned to 20 degrees left rudder and so on until all positions have been verified. Once the test has been completed for one set of steering pumps the alignment is switched and the test is redone using the other set of steering pumps and as appropriate.

3. Order and Indicators must agree within 2 degrees with the rudderpost position.

	30	20	10	5	0	5	10	20	30		30	20	10	5	0	5	10	20	30
RAM										**RAM**									
HELM										**HELM**									
C/L										**C/L**									
PORT										**PORT**									
STBD										**STBD**									
CIC										**CIC**									

(encl 2)

(encl 2)

NAVIGATION LIGHT REPORT

1. **Complete the following Navigation Light Report prior to the inspection. Provide the report to the Inspector. The reference in parentheses is *Navigation Rules, International-Inland* (COMDTINST M16672.2B) unless otherwise indicated. For conversion, 1 M = 3.25 FT.**

    a. **Last light survey conducted: _____. Length of ship: _____ FT/M. Breadth of ship: _____ FT/M.**

    b. **Vertical height of forward masthead light is _____ FT/M above the hull (upper most continuous deck). This height <u>is/is not</u> 6 M or, if the ship's breadth is greater than 6 M, equal to the ship's breadth but need not exceed 12 M. (ANNEX 1 Para 2a)**

    c. **The aft masthead light is _____ FT/M vertically higher than the forward masthead light. This distance <u>is/is not</u> at least 4.5 M. (ANNEX Para 2a)**

    d. **The sidelights are _____ FT/M above the hull. This distance <u>is/is not</u> greater than ¾ of the height of the forward masthead light above the deck. (ANNEX 1 Para 2g) The side lights <u>are/are not</u> forward of the forward masthead light/ (ANNEX 1 Para 3b)**

    e. **The sidelights <u>do/do not</u> interfere with deck lights.**

    f. **There is _____ FT/M vertical separation between each task light. This distance <u>is/is not</u> at least 2 M. These lights <u>are/are not</u> equally spaced. (ANNEX 1 Para 2I)**

    g. **The vertical separation between each task lights <u>is/is not</u> at least 12 FT as observed by PRESINSURV to ensure visible separation at 3 miles. (INSURVPAC LTR 4730 24 Mar 86)**

h. The forward anchor light is _____ FT/M vertically higher than the aft anchor light. This <u>is/is not</u> equal to a distance of at least 4.5 M. The forward anchor light <u>does/does not</u> have a vertical height above the hull of at least 6 M. (ANNEX 1 Para 2K)

i. The horizontal separation of the forward and aft masthead lights is _____ FT/M. This distance <u>is/is not</u> greater than or equal to ½ the length of the ship, not to exceed 100M. (ANNEX 1 Para 3a)

j. The forward masthead light is _____ FT/M from the stem. This distance <u>is/is not</u> less than ¼ the length of the ship. (ANNEX 1 Para 3a)

k. The diameter of each ball, cone (base) and cylinder day shape <u>is/is not</u> 6 M.

l. Items above which do not meet COLREG requirements (By #):

_____

_____

_____

m. Items in paragraph 1 above which are permanently exempted by COLREG rule 38 (By #):

_____

_____

n. Items in paragraph 1 above, which have approved SECNAV/NAVSEA waiver (By #). List expiration date:

_____

_____

o. Items in (1) above which do not have approved waivers (By #):

_____

_____

2. **The <u>outboard light profile</u> will aid you in completing this form. The light profile is normally found in the ship's booklet of general plans.**

3. **Complete a CSMP entry for each light not IAW COLREGS.**

IN PORT FIX COMPARISON

1. Conduct a fix using all available navigation aids. The visual fix is the reference position.

Date time group: _____

a. VIS LAT: _____ LONG: _____

b. GPS LAT: _____ LONG: _____
^ a-f LAT:_____YDS LONG:____YDS

c. RADAR LAT: _____ LONG: _____

(encl 4)